

**DEPARTMENT OF TRANSPORTATION**  
**ENGINEERING SERVICE CENTER**  
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## **SEAM QUALITY CONTROL STANDARD FOR HELICAL LOCK SEAM CORRUGATED METAL PIPE**

**CAUTION:** Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read "**SAFETY AND HEALTH**" in Section G of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

### **A. SCOPE**

The procedure for ascertaining the quality of the seam of a helical lock seam corrugated metal pipe by visual observation of the lock seam cross section and by determining the tensile strength of coupons cut from production pipe across and normal to the lock seam is described in this method.

### **B. APPARATUS**

A standard calibrated tensile testing machine having an accuracy of 1% of scale reading per ASTM Designation: E-4 is required.

### **C. PREPARATION OF TEST SPECIMENS**

1. Torch or saw cut sample approximately 100 by 50 mm from pipe. See Figure 1 for orientation and location of sample.
2. Saw-cut 25 by 150 mm coupon perpendicular to lock seam. Strive to obtain parallel edges.
3. Dress up cross section of test specimens as necessary with a file to aid in visual evaluation of the lock seam. For visual control only, saw a triangular sample from the seam at one end of a length of

pipe so as to show the cross section normal to the seam. The base of the triangular sample shall be of sufficient width to show the complete lock seam profile. See Figure 1.

4. Flatten ends of coupon for gripping in test machine. Do this in a vise one end at a time, inserting strip in vise to 13 mm from the lock seam. As vise flattens the corrugation, the strip will rotate. Realign lock seam with the flattened ends by use of a crescent wrench or vise grips tightened over the lock seam to prevent distortion of the seam itself while bending the strip back into line.

### **D. TEST PROCEDURE**

1. Determine lock seam quality visually by examining samples of the lock seam cross section sawed from the pipe. See Figure 1 for location of sample. See Figure 2 for the cross section of the sample. Inspect the cross section normal to the seam to determine that all lapped surfaces are in tight contact. Inspect the cross section of tensile coupons prior to flattening of the corrugations. Measure the seam lap and retaining offset distances (see Figure 2) for conformance with specified minimum

dimensions. See Figure 3 for examples of unacceptable seam cross sections.

2. Measure actual length of lock seam tensile specimens to the nearest 1 mm (dimension normal to length of coupon).
3. Tension test the coupon on standard laboratory tensile testing machine using self-aligning grips.
4. Determine maximum tensile load per mm of seam length by dividing total load by actual seam length.
5. Compare resulting tensile load per mm of seam length to that required in the specifications.
6. Record test data with test number, date, sheet thickness, and brand on Form TL-6039.
7. Be sure that each run of pipe fabricated is marked or otherwise identified with the identification number of the corresponding tension test.

#### **E. SAMPLING FREQUENCY**

1. Have the manufacturer cut seam samples as required during the startup of each

change of pipe diameter, brand of sheet, or sheet thickness until the lock seam meets all the requirements specified. Obtain a minimum of one triangular seam sample for visual evaluation per day for each size and thickness of pipe produced per day. Instruct the manufacturer to identify seam samples to the pipe produced by date and retain for review by the State Inspector. If visual evaluation indicates a borderline seam quality, instruct the manufacturer to cut additional samples for tensile testing.

#### **F. REPORTING**

Record test data on Form TL-6039, as determined in Part D, Test Procedure. Indicate compliance to both physical and visual requirements. Notify fabricator of results.

#### **G. SAFETY AND HEALTH**

Prior to handling, testing or disposing of any waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0 and 10.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. Users of this method do so at their own risk.

**End of Text (California Test 662 contains 4 pages)**

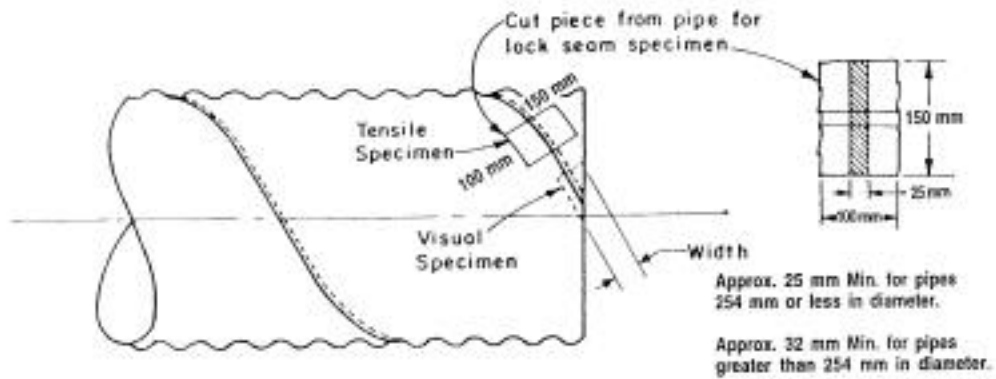


FIGURE 1 - LOCATION OF SAMPLE

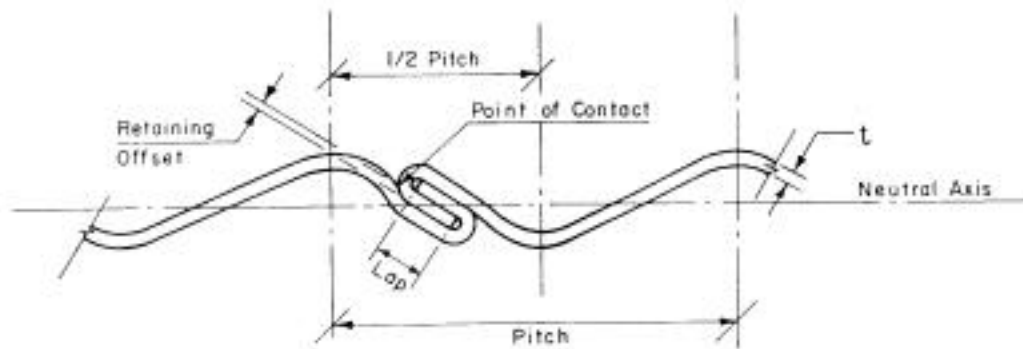
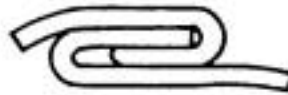


FIGURE 2 - LOCK SEAM CROSS SECTION



Excessive  
Interior Angularity



Insufficient Retaining Offset



Excessive  
Interior Angularity  
and Roller Indentation

FIGURE 3 - EXAMPLE OF UNACCEPTABLE SEAMS